"If war were declared to-morrow, what would we do for aircraft?"

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Official Photo, Aircraft Squadrons, Battle Fleet

VOLUME XIV

Number 14

SPECIAL FEATURES

WRIGHT ALL-METAL PURSUIT PLANE

FOKKER F5 COMMERCIAL TRANSPORT PLANE

NEW YORK TO NEWPORT AIR SERVICE ASSURED

CHARACTERISTICS OF THE U. S. NAVAL AIRSHIP ZR3

THE GARDNER, MOFFAT CO., INC.

HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y.

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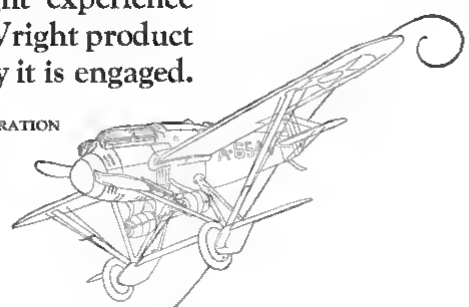

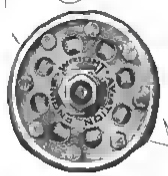

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APRIL 2, 1923

AVIATION

VOL. XIV. NO. 14

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CONTENTS

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New Air Mail Planes

It is gratifying to note that the plans for night flying of the Air Mail Service have now progressed to the point of warranting the Post Office Department in order new experimental airplanes for this work. This indicates that by summer the United States will again take a long step forward in solving the problem of commercial air transport.

The emergency landing fields on the Chicago Cheyenne section of the transcontinental mail airway, where night flying is to be tried out first, have been selected, and when the new ships now on order will have been delivered, everything will be in readiness to start the experiment. Just what the characteristics the new air mail ships will have has not as yet been disclosed by the Air Mail Service, but it is hoped that they will embody the best available practice in airplane design and construction, so as to render them as safe for night flying as human ingenuity will allow.

The importance of the night flying which the Air Mail Service is about to undertake can hardly be overestimated. The fact that a 36 hour day mail and night service will greatly advance the transcontinental mails, is obviously important from the business viewpoint. But what is even more important is that by organizing night flying on a large scale—over a distance of about 1000 miles—the Post Office Department is pioneering in a field which holds in the balance the possibilities of the future for high speed passenger and freight transport all over the world. The few experimental night flights which have been made between Paris and London after careful selection of suitable weather have barely touched the surface of the problem of night flying. The real solution lies, of course, in a continued operation of machines over an extended route, and in this respect the Chicago to Cheyenne airway offers great possibilities.

The Air Mail Service was the first to demonstrate that an air transport service could be maintained on a regular schedule almost regardless of weather. Once more, the world looks to it for a demonstration that night flying is a practical proposition.

Government Competition

Under the law it is now possible for arsenals and navy yards to bid for government work. If they are the low bidders, the War and Navy Departments are compelled to award them the contract.

In this connection it will be a shock to the aeronautical community to learn that recently the Shipping-Board awarded the New York Navy Yard the contract for reconditioning the *America*. The Navy, having no overhead or capital charges, can naturally underbid private ship building firms. The ship building interests protest against this state of affairs, on the ground that they are being taxed to maintain Navy Yards which offer them ruinous competition, but their protests will do them little good as long as the present law is allowed to stand.

This condition also applies in a certain degree to aeronautical *materiel*, and particularly to aircraft engines. When an arsenal bids on aircraft engine work, it is natural that its bid will be lower than that of a private firm. And as under the law the contract must be awarded to the lowest bidder, it follows that whenever the work of a government plant is slack, all it has to do is to compete with private manufacturers for government business—and soon renewed activity pervades the government plant.

What even increases the unfairness of this kind of competition on the part of the government is that navy yards and arsenals do not have to stand by their bids, whereas private bidders have to. Bids of government plants are only estimates. In the event of excessive cost or time, the Navy or the Army have to make up the loss, which means that it is the taxpayer who pays the difference.

That this kind of competition is highly unfair, whether it affects shipping or aircraft, will generally be admitted. Clearly, it is a method used by Congress to keep a large force of workmen employed in local yards and arsenals. It is practical politics at its worst.

W for Wright

The nationality marks for civil aircraft used by the different countries, which are printed in this issue, have with a few exceptions been established by international agreement embodied in the International Air Navigation Convention of 1919.

Under this convention, American civil aircraft are allotted the nationality letter N, which is also one of the radio call letters allotted the United States in the International Radio Convention. This country has never ratified the International Air Convention, and in the meantime Norway has appropriated the letter N for civil aircraft of its own nationality.

Inasmuch as the letter W is another one of the radio call letters allotted to the United States, it would be a gracious act of homage to the Wright brothers if the United States adopted this letter as its aeronautical nationality mark, for every American civil aircraft would then become a constant reminder of the pioneer work done by the two brothers from Dayton.

"If war were declared to-morrow what would we do for aircraft?"

The Wright All-Metal Pursuit Airplane

Duralumin Cantilever Monoplane Characterized by Excellent Performance and Military Adaptability

The Wright Aeronautical Corp. has just brought to this country an airplane, which it had built in Switzerland by the Dornier Company to fill American requirements. The machine is designated in this country as the Wright All Metal Pursuit, while abroad it is known as the Dornier "Falke" (Falcon).

Engineers employed by the Wright Company spent some six months in Switzerland and directed the building of the plane. Its first flights also took place there, and later, at a recent demonstration at Hazelhurst Field, the plane made a splendid showing. Its owners claim that the Wright all-metal pursuit plane can climb 10,000 ft., light, in 5 min. 1 sec., and can attain the same ceiling in 6 min. 44 sec., carrying the full military load, as required by specifications for pursuit machines. In a speed test it did more than 160 m.p.h.

Simplicity of Construction

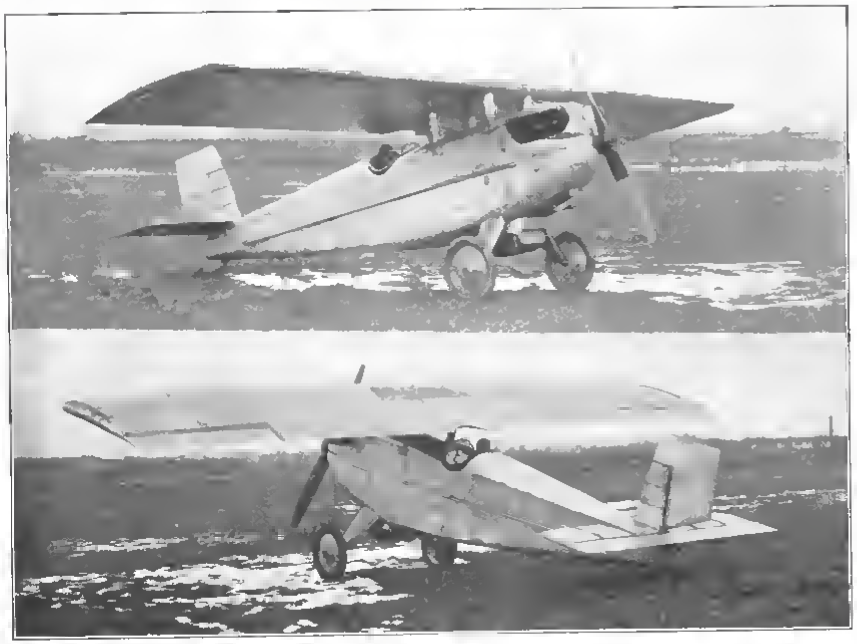
The construction in this plane is very simple, plain and rugged. All wing beams and highly stressed parts are of steel, while the covering and much of the framework is duralumin. The framework of the fuselage is built up at a single cost of duralumin over a series of box girders which hold the body to its designed shape. When the pilot's seat is removed it is possible for a man to get inside and back almost to the tail. If wires need inspection or if repairs are necessary to almost any part of the shell, this is a decided advantage. Not alone is it possible to work on the inside but there is enough strength in all parts that the workman may rest his own needs as to where he will sit or move. The method of attaching the fuselage to the wing is a departure from standard practice, four bolts hold the four short struts (integral with the wing) and the fuselage together. This is done primarily for pilot's vision dead ahead. The wing is placed so that the pilot's eye comes on a center line, thus making possible vision above and below with a minimum blind angle. The four struts are not cross-braced by wires as in standard practice and there are no brace wires anywhere on the plane, each part being strong enough to stand without external bracing.

The engine bed is the only part in the whole plane where wood is used. The mounting is constructed of box beams of duralumin and steel where necessary. The whole is neatly cowled in with the top and sides hinged. Snap fasteners catch and hold the parts in a rigid form when in place, but the whole engine can be laid bare as easily and quickly as raising an automobile cowl. The top part is hinged so that it rests against the wing when raised; the sides bend down and bare the engine to its mounting. It can be replaced almost as quickly as opened, and makes a neat streamline form, the lines of which conform to the fuselage.

A fuel tank, having a capacity of approximately 2 hr. full speed, is conveniently located. To feed to the carburetor, air pressure is used as the tank is not high enough for gravity feed. The oil tank is on the right side and is filled by removing a small hand-hole plate. Both tanks are separated from the pilot's cockpit by a bulkhead for fire protection.

The cockpit is roomy and comfortable. All controls are conveniently placed and every instrument is readily visible. A small windshield protects the pilot from the direct blast of air.

Tail surfaces are bolted rigidly to the main structure. Flipper and control wires are double to insure safety. All controls are sufficiently large and have the proper movement to give a quick and easy control. The tail skid is removable for re-wrapping or such other repairs as may be necessary. It is also entirely of metal.



Two views of the Wright All-Metal Pursuit Plane (Dornier "Falke") fitted with a Wright H-3, 100 hp. engine, which was recently tested at Mitchel Field

Landing Gear

The landing gear is of cantilever design, which does away with the necessity of an axle. Two legs are joined inside the fuselage, in such manner that the shock absorber cord is wrapped around at the top of a forked portion, a pivoting point is just beneath. There is sufficient spring for landing on any ordinary bump, such as all fields have. The benefits derived from this type landing are that very small portion is exposed to air resistance and it is very light. The wheels are reinforced discs with tires 31 in. x 4 in. A bronze bearing which has ample surface fits over the hollow forging of the shaft and is held on by a cap. A wheel can be changed about as quickly as a wire wheel on an automobile. No attempt was made to streamline the wheels other than the disc portion, but the leg which extends from the body and holds the wheel is a very fine streamline.

The Lamblin radiator is elliptical in form and is mounted outside the fuselage between the legs of the landing gear. It is believed that this location is the best, because none of the piping is outside and the fin portion alone is exposed to the air. A small expansion tank is of course necessary, in the line and one is mounted up near the engine, through which the radiator is also filled. Another good result obtained from this location is that the pilot's vision is unobstructed by a radiator, and in case of a puncture by bullet fire he would not be scalded by the hot water. A wing radiator could be used, and then more speed and climb could be expected, as on all occasions where this change was made speed increased 10 to 12 m.p.h.

Flexibility of Installation

The flexibility of this kind of construction and its main advantages are not generally realized. For instance, the Lamblin radiator might be removed without leaving a trace of installation, it could be placed elsewhere, or a wing type used. The wing covering could be removed if that were desired, without any harm to the remainder of the wing—a thing which would never make a clean job on a fabric covered wing. In case of a bad dent or holes torn in the body or wing, or by enemy fire, damage of any sort which might occur can be repaired by cutting the rivets, taking out the part ruined and fit a new piece in its place. In the same way a fuselage could be lengthened or shortened, the cockpit opening changed, or an additional one made. To reach vital and necessary parts of the fuselage hand holes are now in use. These are easily attached or removed by pressing a small spring catch. For another installation where the present doors might not fit, new ones might be cut after closing up those not needed. If a square patch were riveted over the opening it would scarcely be noticed, as rivets are common to this construction.

The assembly and upkeep of this plane are quite simple because of the lack of wires, etc. A small hoist can raise the fuselage high enough to install the two forks of the landing gear. With this done and shock absorber cord in place the wheels can be slipped on. The tail skid and tail planes can go on next, with the wires connecting them to the controls. The same hoist can raise the wing up and the fuselage run under it and four bolts tightened, as there are no wires or braces on which to make adjustments. There is little to require attention on the plane when once it is set up and has an engine installed. The service amounts to gasoline, water, and oil and little else.

Advantages of Metal Construction

The metal feature in the construction of this plane is of great importance for many reasons other than upkeep and repair. It cannot be brought down by enemy gun fire nor set afire as easily as other planes. It is particularly good in that an accident which wrecks the plane there are no splinters, the metal will buckle and bend but it will not break nor catch fire.

If the plane had to be landed in rough country, and it nosed over on landing it is almost sure the pilot would not be hurt. The wing is high enough above the fuselage that when upside down it would keep the fuselage from striking the ground. There is a longitudinal stiffener along the outside of the fuselage but it would not bend so as to fold at the pilot's seat for the reason that the rudder and vertical fin would strike first, thus putting tension in the top of the fuselage. There is every reason to believe that this is a very safe plane to fly.

Military Adaptability

It is impossible to guess what requirements war time developments might demand; but if it became necessary to armor a part of this plane, the construction lends itself to armoring very readily.

The visibility on this plane is among the best that has ever yet been worked out for a pursuit machine, for there is little occasion for an enemy ever to become hidden by the wing. When looking directly ahead, the two rear cabana struts, which hold the after part of the wing in the fuselage, are the only obstruction. The only blind spot which can be found is up directly ahead, the wing there shuts off a very small area. This is not very serious for the reason that the pilot may look over or under the wing without difficulty, besides the ship may be quickly and easily climbed, or if climbing straightened out, which will take care of the one small obstruction. To the sides there are no blind angles, which has many advantages in pursuit work and also affords the vision necessary for landing in small or crowded fields.

On the ground and in the hangar the plane is easily handled. It can be taxied across wind, as has been demonstrated in 25 m.p.h. with 6 in. of snow on the ground. The take off is very rapid, in fact the ship can be taken into the air before the motor has been given full throttle.

CHARACTERISTICS OF THE WRIGHT ALL METAL PURSUIT PLANE

Type	Tractor monoplane
Span	33 ft.
Overall length	28 ft.
Wing chord	6 ft. 6 in.
Total wing area	200 sq. ft.
Engine type and hp.	Wright H3, 400 hp.
Weight empty	1,819 lb.
Useful load	955 lb.
Pilot	180 lb.
Fuel	440 lb.
Ordnance	180 lb.
Miscellaneous	55 lb.
Weight loaded	2674 lb.
Max. speed sea level	140 m.p.h.
Climb in 5 min.	10,000 ft.
Fuel supply	2 hr.
Armament	2 fixed machine guns

Note—The weight item "ordnance" includes the following: one 30 cal. and one 50 cal. machine guns; 600 rounds of ammunition for the 30 cal. gun and 200 rounds for the 50 cal. gun; two synchronizers, one 5 in. ring sight and one Aldis sight.

The weight item "miscellaneous" includes air speed indicator with tubing, altimeter, compass, clock, gas and oil pressure gages, tachometer, water and oil temperature meters, instrument board, mufflers and seat, wind shield, 3-way valve, switch and wiring, inclinometer, safety belt, fire extinguisher and one oxygen tank.

In speaking of the Wright All-Metal Pursuit Plane, F. B. Rentschler, president of the Wright Company, said that the interest of his corporation in bringing this plane to America had been two fold, first the development of an all-metal plane, the construction cost of which would be substantially equivalent to that of a wooden fabric plane, and secondly the development of an all-metal plane with flying characteristics substantially as good as any wood and fabric type.

"We are in a position to reproduce planes of this general type at prices substantially equivalent to prices of planes of wood and fabric construction," Mr. Rentschler said. "Moreover, the flying characteristics of the Wright all-metal plane compare more than favorably with any present pursuit type of wood and fabric construction. It must be borne in mind, of course, that the Wright all-metal plane is not equipped with wing radiators, but with the Lamblin type. For racing or record purposes, wing radiators could, of course, be supplied to this type of ship."

New Load Carrying Record

The contest committee of the Aero Club of France has homologated as a new world's load carrying record for altitude the performance made Feb. 12, 1923, at Buc, France, by Jean Casale, who climbed 4791 meters with a useful load of 500 kg. The performance of 7200 meters with 250 kg. useful load, which the same pilot made on Feb. 11 and which we reported in our last issue, has not been homologated as a record, apparently because it did not beat the existing record by the specified margin.

The new category of load carrying records for duration, distance and altitude was instituted by the International Aeronautic Federation (F.A.I.) as a simplified substitute for the passenger carrying records previously recognized (two, three, four, five passengers and so on). The load carrying records are recognized for the following weights: 250 kg., 500 kg., 1000 kg., 1500 kg., 2000 kg. and each additional 1000 kg.

Aircraft Exports

The list of automotive exports from the United States, January, 1923, issued by the Department of Commerce, includes twelve airplanes and seaplanes valued $203,010.00, and five aircraft engines valued $1,200.00.

December 1922 no aircraft were exported, only seventeen aircraft engines valued $1,400.00, while in January 1922 one airplane valued $5,000.00 and three aircraft engines valued $5,275.00 were exported.

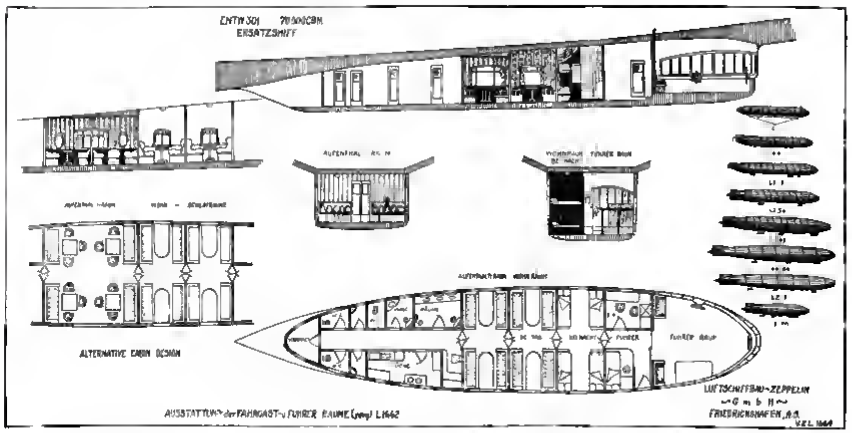
Characteristics of U. S. Naval Airship ZR3

The large rigid airship which the Zeppelin Co. is building on the German reparations account for the United States Navy and which is to be called the ZR3 has the following principal characteristics:

Capacity	88,000 cu. meters.
Overall length	206 meters.
Master diameter	27.9 meters.
Maximum breadth	28 meters.
Maximum height	31 meters.
Power plant	5,400 hp.
Total horsepower	2000
Disposable lift	42 tons (51.7% of gross lift)
Max. speed	78.3 m.p.h.

This ship has cabin accommodations with sleeping quarters for thirty passengers. The diagrammatic sketches on this page indicate the alternative arrangements for day and night use. This sketch, together with the above data is taken from Air Service Information Circular No. 391, being the technical supplement of the Report of Inspection Trip to France, Italy, Germany, Holland and England, made during the winter of 1921-22 by Brig. Gen. William Mitchell, Assistant Chief of Air Service, First Lieut. Clayton Bissell and Aeronautical Engineer Alfred Verville.

Until the ZR3 is officially commissioned in the United States Navy, she is known as "Design 301."



Internal arrangement drawings of the car, as fitted for day and night use, of the Zeppelin airship ZR3 now building for the United States Navy

"If war were declared to-morrow what would we do for aircraft?"

Fokker F5 Commercial Transport Airplane

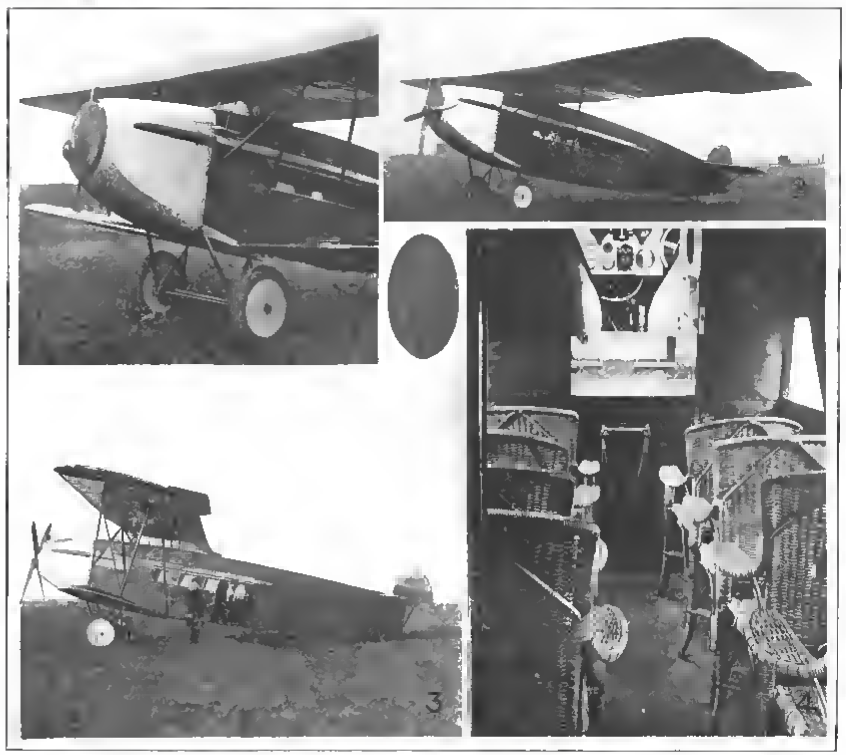
Convertible Wing Feature Permits of Speed And Load Variation for Different Services

The latest commercial airplane developed in Europe for use on airlines is the new Fokker, known as type F5, which incorporates all the experience gained during the last three years with the Fokker F2, F3, and F4 types. The F3 is well known for its consistent record for safety and economy on five of the main European air lines, while the F4 type, in the hands of the United States Army Air Service, made two of the greatest flights in the history of aviation in October and November, 1922, the world's unofficial endurance record 35 hr. 18 min. and the longest non-stop cross country flight ever made, from San Diego to Indianapolis, a distance of 2060 miles.

On the strength of these past performances alone a new type of Fokker commercial plane is sure to be of extraordinary interest but it will be seen from the following description that it is an interesting development by virtue of its novel features also.

Divergent Needs of Air Lines

In the first place it should be explained that in the course of commercial operation during the past few years the divergent requirements of each route have become more and more clear. A route like that between Koenigsberg and Moscow, a distance of approximately 750 miles, over which a regular service of three round trips weekly is maintained with Fokker F3 monoplanes and where the railroad service is almost non-existent, the obvious need is for a plane of large carrying capacity, while high speed is not of such great importance. Incidentally, this route is the longest in the world regularly flown without change of airplane or pilot.



The Fokker F5 commercial airplane—(1) View of the nose. (2) The machine fitted as a monoplane: speed 118 m.p.h., useful load 2000 lb. (3) The same fitted as a biplane: speed 110 m.p.h., useful load 3300 lb. (4) Interior view of the cabin, showing door and movable step to pilot cockpit. This is a very foreshortened view owing to the position of the camera. The actual length of the cabin, exclusive of entrance way, baggage hold and toilet, is over ten feet.

"If war were declared to-morrow what would we do for aircraft?"

On some of the other lines, where there is direct competition with the fast railroad service or the loads carried are largely urgent express matter and mail, high speed, even at the sacrifice of considerable load capacity and at the cost of increased landing speed, is essential.

In the Fokker F5, one of the chief features is the possibility of quickly varying these characteristics. It is clear that this procedure will also go far toward making it possible to build commercial planes in the small quantities at present required at a more reasonable price than would be the case if a separate type of plane has to be designed to suit the requirements of service on each line.

The Biplane-Monoplane Feature

It has been the aim of the designer to produce a fuselage which would suit every requirement and on which wing systems of various designs can be fitted while maintaining the good flying qualities for which Fokker planes are noted. For this the internally braced, or cantilever type of wing construction of which Fokker has for years been one of the most successful exponents, is of course particularly suitable.

The F5 may be flown as a biplane or a monoplane, by the simple expedient of attaching or removing the lower wings. As there is no bracing or rigging this is a simple matter. The top wing is in one piece and 49 ft. in span. Its factor of safety is so high that it will carry the weight of the machine, although with reduced load, as a monoplane or it will carry the load from two bottom wings hingedly attached to the fuselage and supported at the outer ends by N struts.

Performance

As a monoplane, the total useful load is 2000 lb. which is equivalent to two pilots, 5½ hr. gasoline at cruising speed and 770 lb. of pay load, and the maximum speed approximately 118 m.p.h.

As a biplane, the useful load is increased to 3200 lb. equivalent to the same amount of fuel, two pilots and 1950 lb. pay load, and the speed is 110 m.p.h.

The above performances apply to the F5 as fitted with a Liberty engine. The experimental machine has been flying with a Rolls Royce engine of only 340 hp. but practically any engine of approximately 350-450 hp. can be fitted.

Wing Construction

As in the previous Fokker commercial planes, the wings are built up with a very high factor of safety on box spars and covered with 3-ply veneer. In connection with this method of covering it is interesting to note that the wings of some of the F3 machines which have been in constant use for nearly three years, were recently opened up for inspection and found to be as good as the day they were built.

A very simple nose radiator cooling system is used, which can be removed from the machine separately or in one unit with the engine by taking out four bolts; the radiator is circular in front view, which has made it possible to design a fuselage of very efficient shape in spite of the large cross section necessitated by the cabin.

Controls

Two pilots with full dual controls are seated behind the engine, side by side, in a very roomy cockpit, with a door between the seats through which either pilot can go down into the cabin. The engine controls and all instruments are fitted in the center of the cockpit so that they are equally accessible to both pilots. Wheel control is used for the ailerons and all controls are non-magnetic.

The gasoline system consists of a double gravity tank in the wing and one feed pipe only. The shut off cocks are fitted directly to the tanks, and within reach of either pilot.

The control cables all pass outside of the fuselage where they are constantly open to inspection and only straight cables and levers without pulleys are used. The stabilizer is adjusted from the pilots' seat by means of a very simple worm gear, of which the actuating rods also pass outside the fuselage.

The Cabin

The cabin is probably the largest compartment yet provided on such a comparatively small plane. Including the entrance space and the toilet the total length of the cabin space is 14 ft., while there is sufficient head room for a 5 ft. 10 in. man to stand upright, the width of the cabin which is 5 ft. provides plenty of space for the two rows of four chairs which are normally fitted for passengers.

The cabin is well lighted by four large windows on each side, all of which can be slid open. Above the windows sliding ventilators admit clean hot air from a jacket surrounding the exhaust pipes when required. These pipes are lead way back to the cabin whereby the noise is greatly reduced.

Behind the actual passenger cabin there is a kind of entrance hall in which considerable baggage can be placed or alternatively, another seat. Aft of the entrance a very roomy lavatory is fitted up with the usual toilet, washing and drinking facilities.

The door is so close to the ground when the airplane is at rest that no step or ladder of any kind is necessary. There is a lock up baggage hold of 42 cu. ft. capacity, accessible only from the outside, underneath the floor of the pilots' cockpit.

Fuselage Construction

The fuselage construction throughout is on a completely new principle, the actual frame work is the usual Fokker welded steel tube construction, but the tubular members are built into wooden box members and the entire fuselage with the exception of the engine section, then covered with 3 ply veneer which forms at once the covering, the bracing, and the cabin walls. While the rigidity, practically indefinite durability and ease of repair which characterize the steel tube structure are in this way retained all bracing wires which usually require occasional adjustment, and fabric, which on most airplanes requires replacement fairly often, are done away with.

The stabilizer is covered with veneer, like the wings which makes it very stiff and prevents any flutter. The elevators and rudder are of the usual Fokker steel tube construction and fabric covered. The same applies to the ailerons.

Landing Gear

The landing gear is of a new type which has been fitted to all the most recent Fokker machines. In this type, the axle is suspended entirely between rubber cord above and below and does not touch any of the undercarriage tubes, by this means the axle floats completely in rubber both up and down and sideways. The result is an extremely soft undercarriage which relieves the fuselage from all shocks and vibration. The tail skid is also universally jointed and so suspended on rubber that the shocks in all directions are absorbed.

As an alternative to the above described monoplane and biplane wing systems, a big tapered monoplane wing, of the type used on the previous Fokker commercial planes, can be fitted. With this wing the F5 constitutes the latest improvement in single engine weight carrying commercial planes, in this shape it is in fact the logical successor to the famous Fokker F4 transport (T2) with which Lieutenants Macready and Kelly recently made their world's record flights.

Wearing Qualities of Fokker Airplanes

In view of the distrust felt in some quarters with regard to cantilever wings and welded steel tube construction, specially where the welded parts are in tension, considerable interest attaches to a recent report on the wearing qualities of Fokker airplanes by the Engineering Division of the Dutch Army Air Service (*Luchtvaartafdeeling*). The report says in part:

"Though a two years' experience with a small series of Fokker D.III, Gnôme-Oherusel 160 hp. scouts, which had a fuselage of welded steel tubes, sufficient confidence in this system of fuselage construction was gained to warrant an order on a larger series of similarly constructed machines. That this confidence was not ill placed, is proved by subsequent events.

"The types of machines are both well known, the Fokker D.VII being generally much appreciated by pilots (a couple of these machines had been in use at Soesterberg, since 1918), while the C.I. was a new design brought out since the armistice and the first 2-seater reconnaissance machine designed at the Fokker Works. This type had not been built in series and the Luchtvaartafdeeling received the first series of these machines. Both airplanes have the same motor, the B.M.W. altitude type, 185 hp. nominal.

Long Safety Record

"At the time this report is compiled (March, 1922) these machines have, according to the logbooks, an actual flying time of 11,000 hr. (10,868 hr. 30 min.). During this time not a single fatal accident occurred, while only in one instance (caused by stunting at low altitude) injury of a more or less serious character resulted for the pilot.

"At the Luchtvaartafdeeling every airplane is subject to a complete overhaul in the workshops after 150 actual flying hr. In special cases this period may be lengthened after inspection by the controlling engineer to an absolute maximum of 200 hr., but the rule is revision after 150 hr. For school machines (some of the Fokker C.I. machines are equipped with dual control for instructional purposes) the rule is inspection, e.g. revision after 400 landings or 100 hr. (liable to a possible extension to 150 hr. maximum). On an average these machines have now each some 650 landings to their account.

"In comparison to other machines, the Fokker airplanes have been strikingly successful. Bearing in mind that the C.I. as used at the Luchtvaartafdeeling, was a first production, one may say that it showed very few of the troubles, generally inherent to a new type. There are three predominant factors, when judging the relative merits of steel tube structures as used in Fokkers against the more orthodox constructional methods: trussed fuselages with wooden longerons and wooden struts or wood and plywood monocoque fuselages: (1) Simplicity of overhaul and repairs; (2) General accessibility; (3) Damage done to machine and danger to pilots in crashes.

Advantages of Steel Tube Fuselage

"The steel tube construction scores under all three headings. Nothing could be simpler than the overhaul of a steel fuselage. After stripping it of its fabric the naked structure is open to inspection from all sides. The accessibility of the fuselage structure itself is far better than in most other constructions, but more important still is the engine accessibility which this type of construction affords.

"Provided suitable materials are used and the tubes are not brittle, it is quite astonishing to see what distortion in crashes can take place with Fokker fuselages, without any direct fracture. In all accidents to Fokker machines the cockpits did not suffer. Even in the case in which a pilot lost his way at night and struck the earth in a ground mist during his downward glide before flattening out, thus diving, as it were right into the very hard aerodrome soil, the pilot escaped without a scratch, although the machine was a complete wash out.

"In report M.40a (tests on the strength of fuselages composed of seamless steel tubes, joined by welding) of the Dutch National Aeronautical Research Laboratory special attention is drawn to this significant fact, which contributes greatly to the safety of the occupants and which may be ascribed to the large amount of destructive power absorbed by the deformation of the steel-members in the front and bottom of the machine.

Behavior of the Wings

"The wings are of astonishing strength, specially in crashes and are exceedingly simple in repairs. Even in the worst accidents it is an exception to find a broken spar which cannot be repaired with very little trouble. If spars show a fracture after a crash it generally is in the thinnest part at the wing tips and is occasioned by the crushing of the wing tip in striking the earth. Such fractures, which are rare, are easily repaired by making simple splices in the top and bottom beams (staggering the scarfs according to the laminations) and fixing new plywood webs (over a greater area than that limited by the splice).

"The Fokker C.I. as well as the Fokker D.VII, has given great satisfaction in service. The different difficulties which were encountered are, all of them, of a minor character and can be remedied with small trouble. The general impression left by 11,000 flying hours' service is an excellent one."

List of Civil Aircraft Markings

The following list of civil aircraft markings used in the different "airfaring" countries has been compiled by AVIATION from official and unofficial sources. The information may be regarded as substantially trustworthy.

The names of the countries which have signed and ratified the International Air Convention of 1919, or have adhered to it, are printed in *italics*; those which have signed but not yet ratified the I.A.C. are in brackets. Some of the latter countries (Italy, for instance) already use the markings indicated.

Under the provisions of the I.A.C. civil aircraft are designated by a nationality mark and a registration mark, the latter consisting of a four-letter group. The nationality mark is in principle a single letter, but as the alphabet does not contain a sufficient number of letters to give each country a seperate initial, the smaller countries are identified by the so-called nationality letter and the first letter of the registration mark (for instance, C-C, Cuba; C-R, Rumania).

Germany, Switzerland, Russia and Colombia use a number as the registration mark.

The letter N, originally assigned in the I.A.C. to the United States, has since been adopted by Norway.

NATIONALITY MARKS OF CIVIL AIRCRAFT

A*	Colombia	(I	Italy)
(A H	Hedjaz)	J	*Japan.*
A N	Nicaragua.	(L-B	Czechoslovakia)
B L	Latvia	(L G	Guatemala)
C B	*Bolivia*	L-L	*Liberia*
(C C	Cuba)	(L-U	Luxemburg)
CH*	Switzerland	M	Spain
C P	*Portugal.*	N	Norway
(C R	Rumania)	(N	United States)
(C U	Uruguay)	O-B	*Belgium*
D*	Germany	O P	*Peru*
(E-E	Ecuador)	(P B	Brazil)
F	*France.*	(P P	Poland)
G	*British Empire*	RR*	Russia
G A	*Australia*	S G	*Greece*
G-C	*Canada*	(S-P	Panama)
G L	*Great Britain*	(X C	China.)
(H H	Haiti)	(X H	Honduras)
H N	Netherlands	(X S	Yugoslavia.)
H S	*Siam.*		

*The registration mark consists of a number.

Notice to Aviators

Issued by U. S. Hydrographic Office

Florida Reefs—Key West Harbor approach—On Jan. 29, 1923, a white second class nun buoy with red flag was established, in connection with aviation activities, in the approach to Key West Harbor, on the bearings:

Sand Key Lighthouse ..... 266°
Key West Lighthouse ..... 349°

Approx. position: 24° 27′ 30″ N., 81° 47′ 00″ W.

On Feb. 8, 1923, a white second class can buoy with a red flag was established, in about 6 fathoms of water, about 1,000 yards 169° from a similar buoy, previously established, on the bearings:

Sand Key Lighthouse ..... 271°
Key West Lighthouse ..... 349°

Approx. position: 24° 27′ N., 81° 47′ W.

These two buoys will be maintained for aviation purposes until about May 1, 1923.

(N.A. 3, 1923.)

(Notice to Mariners 7 (219), Lighthouse Service, Washington, 1923.)

U. S. Coast Survey Chart 584.

New York to Newport Air Line Assured

To be operated with Loening Air Yachts on 90 min. schedule

Commercial air transport service by flying boats operating on regular schedule between New York and Newport, R. I., which was forecast by AVIATION some time ago, is to become an established fact early this summer.

Financed by a group of bankers and residents of Newport, the New York-Newport Air Service, Inc., which has been incorporated for this purpose, intends to start operations in June with Loening Air Yachts of the 1923 model. These flying boats will be luxuriously equipped and will be capable of a maximum speed of 120 m.p.h. The flying schedule calls for a 90 minute trip, whereas the best railroad time is 6½ hr.

Terminals and Schedule

The New York terminal of the air line will be at Thirty-first Street and the East River, chosen for its accessibility and because the river is widest there and provides ample space for landing and taking off. The Newport air station is near the James Yacht landing.

Two trips each way are contemplated on Fridays, according to a booklet issued by the company. The planes will leave here at 2.30 and 3 p. m. Four seats with space for baggage will be provided in each plane. Extra planes will be held in reserve to handle the bookings. The trips from Newport will be made at 9 and 9.30 a. m. Saturday patrons will be accommodated by planes leaving here at noon and returning at 6 o'clock Sunday evening.

In addition to the scheduled flights, the company announced that it would maintain a chartering service from New York to any point on the Atlantic Coast. These trips will be made at the rate of 50 cents per passenger mile, including baggage.

The Company

The company is the outgrowth of an idea fostered by Newporters who flew last Summer in the Loening air yachts owned by Vincent Astor, R. W. Judson and Harold S. Vanderbilt. Mr. Astor commuted daily from New York to Newport and Southampton, frequently lunching in Manhattan, dining at Newport and dancing later at Southampton on the same evening. The credit for organizing the New York-Newport line is mainly due to T. Suffern Tailer, whose energy and ability is responsible for interesting the other prominent people in the project.

When Grover Loening, the designer of the Loening Air Yacht, was approached on the subject of establishing a regular air line he pointed out that the only way that such a service could be maintained under present conditions was through a subsidy similar to the universal practice abroad. As there was no present prospect of the Government subsidizing a flying service, it must be undertaken if at all by public spirited citizens. Through the efforts of Mr. Tailer such a group of citizens have stepped in to guarantee the operation of the New York-Newport service.

The practical working of the so called subsidy is as follows. The Loening Corporation's experience shows that 50 cents a mile is the operating cost of the Loening Air Yachts. This results in a charge of $30 per passenger for a flight between New York and Newport. Passengers on the New York-Newport Air Service will pay $15 each. The remaining $15 per passenger is paid to the operating company by the group of people who have underwritten the subsidy.

The directors and incorporators of the New York-Newport Air Service, Inc., are Mr. Astor, Grover Loening, President of the Loening Aeronautical Engineering Corp.; Roger M. Poor, Edwin de T. Bechtel, Charles L. Lawrence, Albert Palmer Loening and John Carrington Yates. Among those who have contributed to the subsidy with which to maintain the service are Robert Goelet, Arthur Curtiss James, James B. Duke, Henry Walters, Oliver Gould Jennings, Henry A. C. Taylor, Stewart Duncan, R. Barton Jacobs, Marion Eppley, George Henry Warren, John Aspegren, J. F. A. Clark, Francis Roche, George B. Widener, L. Townsend Burden, William Fahnestock, Condé Nast, T. Suffern Tailer, Lawrence L. Gillespie, Paul Fosdick, R. G. Shaw, Oscar Cooper, Edson Bradley, Grafton Cushing, Bradford Norman, Mrs. James B. Haggin, Mrs. Charles F. Hoffman, Mrs. Hugh Auchincloss, Mrs. O. H. P. Belmont, Mrs. Frederick Pearson, Mrs. Horace Gallatin and Mrs. Nathaniel Thayer.

Development of the Loening Air Yacht

The original Loening Air Yacht, developed in 1919, cost its designers, the Loening Aeronautical Engineering Corp., for engineering and construction $40,000. This sum was exclusively from the funds of the company and was spent without an order for the ship or definite knowledge of a possible purchaser. It was designed and constructed because the Loening Corporation wished to be the first to build a modern American flying boat for passenger service and was willing to back with its money a belief that there was a place in American aeronautics for such a ship.

Performance of the first Loening Air Yacht met all expectations. In its first public test it established the world's seaplane altitude record of 17,550 ft. on Aug. 16, 1921, with four persons on board. On April 17, 1922, with Clifford Webster as pilot, and a mechanic, this same ship made the fastest flight between Miami and New York ever recorded, covering 1220 miles in 9 hr. 56 min. with one stop enroute. These and numerous other demonstration flights with prominent people as passengers led the following year to the sale of three Loening Air Yachts to Vincent Astor, R. W. Judson and Harold S. Vanderbilt.

Then followed orders for eight Loening Flying Yachts from the Army Air Service, for use as transport machines in our island possessions. Two of these ships are now on their way to the Philippines and the remaining six are nearing completion.

Book Review

THE AVIATOR. By Henry C. McComas, 214 pp. Ill'd. (E. P. Dutton & Co., New York.)

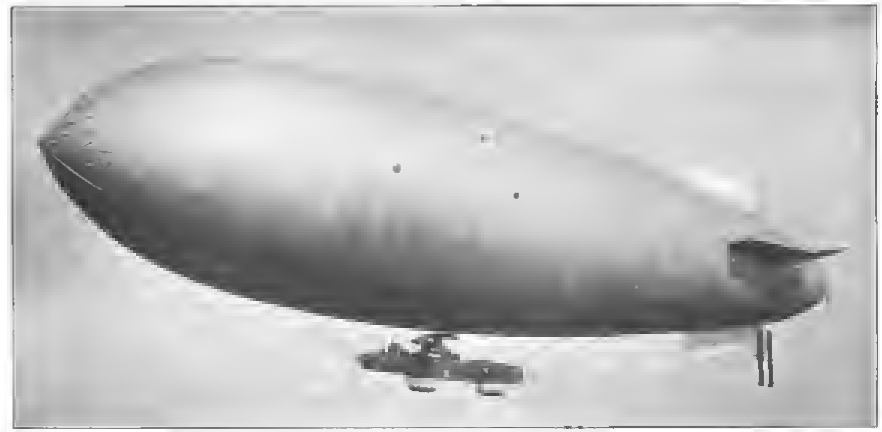
Hitherto comparatively little scientific attention has been devoted to the man behind the flying machine. Scientific tests have been developed for determining the mental and physical capacities of aviator pupils, it is true, but accurate information as to what constitutes fitness for flying has not been readily available.

The author of this book, who is professor in the Division of Science at Princeton University, and who during the late war was attached to the Research Laboratory at Hazelhurst Field, Mineola, with the rank of Captain, U.S.A., seeks to remedy this lack in a suggestive and stimulating volume. He discusses the necessary personal equipment of an aviator from both the physiological and psychological points of view. The senses employed by an aviator, the organs in the body which control those senses, the nerve-system which controls those organs, and the factors which, in turn, control the nerves are examined, with a view of discovering why an efficient aviator is efficient and what particular type of man is best fitted for the career—and, further, how this fitness may be preserved and increased.

This is a book which opens up a fresh and most important aspect of the science of aviation, and should be in the hands of everyone in any way connected with flying whether as amateur or as professional.

Trials of New Goodyear Army Airship TC1

Nonrigid of 200,000 cu. ft. Has Many Novel Features



The new Army airship TC1, built by the Goodyear Tire & Rubber Co. of Akron, on her trial flight. The ship is fitted with two 150 hp. Hispano-Suiza engines.

The United States Army airship TC1, the largest nonrigid ship ever built in America began her trial flights last week at the Goodyear Akron Air Station, under the supervision of a crew of officers and men from Scott Field, Belleville, Ill.

The TC1 is the first of three ships of this type being built for the army by the Goodyear Tire and Rubber Co. of Akron, Ohio, and will be used as a training ship for airship pilots in preparation for several transcontinental flights contemplated by the senior service for this and other ships of this type.

In design and construction the new airship embodies several features especially arranged for the use of helium, which will be the standard lifting gas of this type. During her trials, however, hydrogen gas was used. Her envelope has a gas capacity of 200,600 cu. ft. and she is 195.81 ft. long. The car, suspended from the envelope, is 40 ft. long and contains accommodations for a crew of six men when helium is used. When hydrogen is used a crew of ten men can be carried. Two Hispano-Suiza engines of 150 hp. each furnish the driving power. At a speed of 60 m.p.h. the maximum range is 1070 miles, while at cruising speed (47 m.p.h.) the ship will have a range of 1,630 miles.

The TC1 is equipped with bomb carrying and releasing devices. One 1,200 lb. bomb, four 400 lb. and eight 100 lb. will be carried. She also carries a complete radio installation of the latest type.

The crew which carried the TC1 through her preliminary trials was composed of Lt. F. M. McKee, test and instruction pilot, Lt. C. Kunz, test pilot and engineering assembly officer, both of Scott Field, Belleville, Ill., Lt. J. Cinek, official observer and pilot of the Air Service, Washington, D. C., Sgt. Harry Barnes and Sgt. Olin Brown, engine specialists from Scott Field.

A non-stop cross country flight from the Goodyear hangar at Akron to Niagara Falls and back is planned for after the first trials are completed. The big ship will carry motion picture men and special photographers who will take pictures en route. At Niagara the ship will negotiate the famous gorge.

On completion of all trials the TC1 will be flown to Scott Field, Belleville, Ill., where she will be stationed as a training ship for airship pilots. The route to be traversed will include Dayton, Ohio, Indianapolis, Ind., and other important cities of the middle west.

Aviation Patents

Granted March 6, 1923

Reissue

15,555 Aeroplane. Charles Arthur Wragg, Melbourne, Victoria, Australia.

1,447,425 Safety Device for Aircraft. John T. Parr, Oakland, Calif.

1,447,426 Tachometer. Theodore C. Prouty and Willis O. Prouty, Elgin, Ill., assignors, by mesne assignments to Patents Holding Corp., Chicago, Ill., a Corporation of Delaware.

1,447,558 Stabilizer for Dirigible Airships. James N. Lewis, Detroit, Mich.

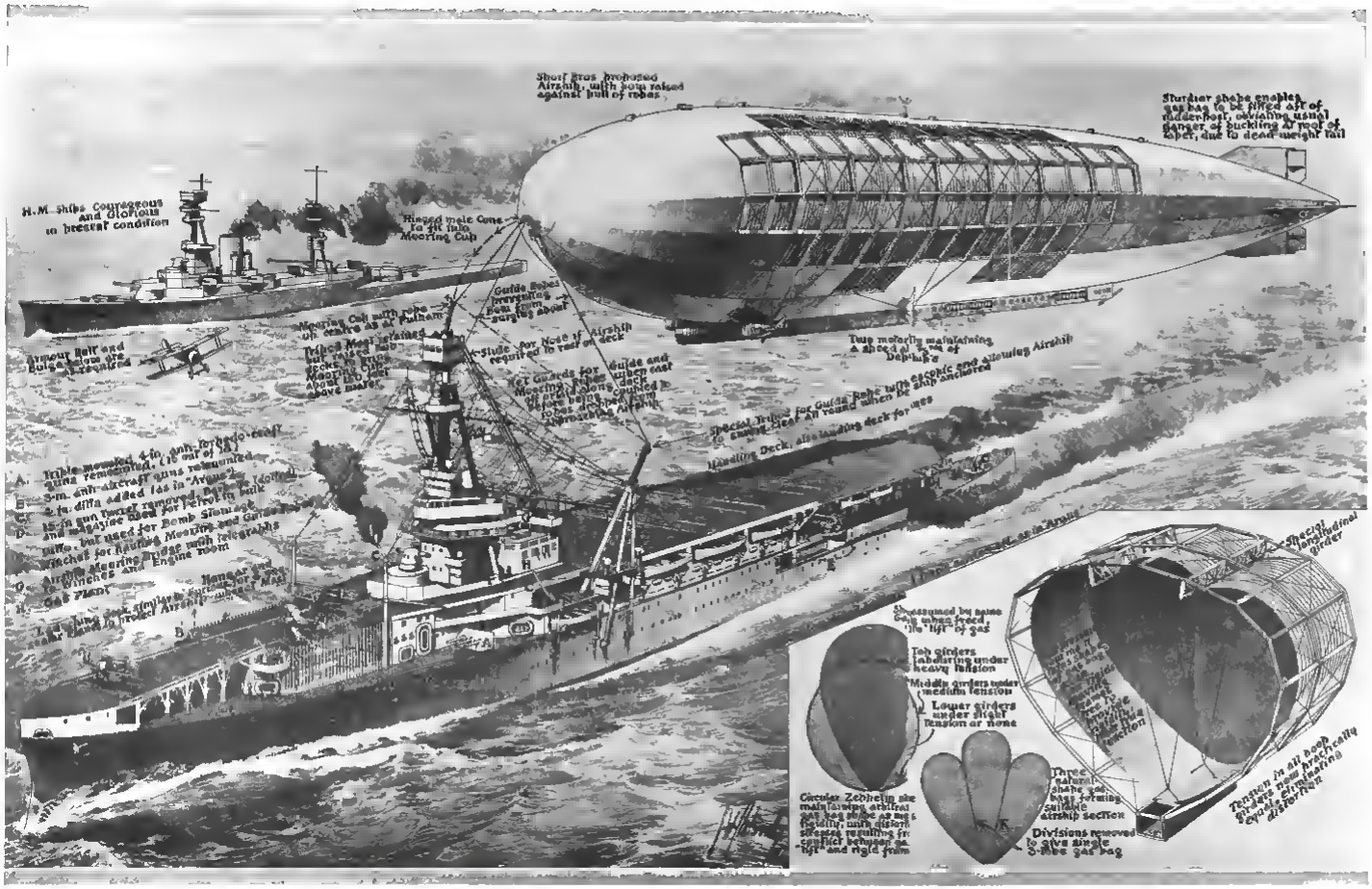
1,447,559 Dirigible Airship. James N. Lewis, Detroit, Mich.

1,447,584 Oswald F. Zahn, Los Angeles, Calif., assignor to Edity L. Zahn, Los Angeles, Calif.

New Dayton Airport

The city of Dayton, Ohio, anticipating the expiration of the Government's lease on McCook Field in June, though under the agreement the Air Service will be permitted to occupy it for another year, has completed arrangements whereby the city will cede to the United States approximately 5,000 acres of land which will be used as a site for the Engineering Division of the Army Air Service. It has been estimated that for the Army to erect the essential buildings an expenditure of about $5,000,000 will be required.

Proposed Type of Rigid Airship for Civil and Mitary Uses and Depot Ship with Mooring Mast



Drawn by S. W. Clatworthy, Copyright in U.S.A. Scientific American Pub. Co.

Great Britain's recent decision to retain airships gives rise to speculation as to possible improvements in design. The new design shown in the accompanying drawing, which is reproduced by special permission of the *Scientific American*, is proposed by Messrs. Short Brothers, who built the successful wooden rigids R31 and R32 and who commenced but did not complete the ill-fated ZR2.

Following the Zeppelin type, all rigids have previously had an approximately circular section, and the conflict in stresses between this arbitrary shape and the gas lift has probably caused, at critical moments during navigation, several past disasters. A cylindrical ballonet, floating free, will assume a shape similar to that of an inverted drop of liquid—as in the lower left-hand corner of the smaller drawing—and when confined in a circular frame, exerts very little outward pressure in the lower half and a maximum at the top. As a result, tension in the lower girders, wires, and fabric is practically non-existent, while in the highest it is at a maximum. The framework is therefore perpetually tortured, so to speak, by this disruptive inequality, against which partial protection only can be provided in the shape of wastefully heavy and needlessly complicated radial wiring.

Now, in non-rigid airships, many of which have proved to be excellent designs, the gasbag is largely untrammeled, and this feature is incorporated in the Short ship by "natural shape" ballonets. A single inverted drop section would not be practical for several obvious reasons. This object is achieved by combining three such, removing the two partitions and substituting lift wires as in the lower diagram. The tendency of the gasbags in existing ships to force up the top longitudinals is obviated here by two special girders of wholesome depth, to which the lift wires are attached. The tension throughout each hoop girder is now practically constant.

Numerous circumferential wires, as shown, take the lift of the gas in the first instance, and are anchored only at their lower ends. From the circular ship, therefore, imprisoning protesting gas containers to the detriment of the structure, we get the new ship with a lightened basket of girdering snugly fitted round quiescent gasbags, and free to fulfil its true function of rigidity.

To point the moral, the ZR2 actually had additional new girders from the keel to the sides, forming a chord in each lower quarter-hoop, distinctly suggestive of this new shape if the outer, original girders are removed. The ship shown is a proposed London-New York passenger liner, 4,450,000 cu. ft., to carry 50 passengers at 60 knots for 6000 nautical miles. Her shape resembles that of the usual double-hulled submarine which is buoyant, of course, submerged in water just as the airship is submerged in the atmosphere. The airship is shown towed from the mooring mast of a converted "Hush-hush" ship.

Experiments in Contact Flying at Mitchel Field

With a Description of the Apparatus for Making Contact

The "contact" flights made March 8, 1923 at Mitchel Field, L. I., by Lawrance Sperry on a U. S. "Messenger" which were briefly reported in our last issue had the object to determine the accuracy and length of time it is possible to fly one airplane in close proximity with another airplane, and what the maximum variation and intervening distances are. The object of obtaining this information has a number of different uses—one of which is the exchange of messages, packages, food, fuel, medical supplies, etc. between one airplane and another without the delay and uncertainty of landing in places where good landing fields are not available.

The Contact Apparatus

The apparatus employed for making the above tests consisted of a trapeze 18 ft. long hung from a DH4B airplane and actuated by four reels in pairs of two each—each pair of which were synchronized—one pair of reels pulls the trapeze forward, and the other pulls it backward or up. In this way, it is possible to lock the trapeze, when fully extended in position, and which not only makes it rigid, but keeps it from twisting.

The apparatus attached to the "Messenger" airplane consisted of a vertical mast, as shown in our last issue, which was pivoted so that it could tip backward. This mast was held in a vertical position by means of an elastic attached below the pivot point.

The scheme of measuring the accuracy of touches was by means of painting the bottom rung of the trapeze with fresh lamp black.

Preliminary Experiments

A great many flights were made prior to those in which contacts were made. It was learned in these flights that it was necessary to control the plane by using the elevator as a throttle, and the throttle as an elevator. This is because the elevator controlling the angle of incidence controls the airspeed and the throttle, therefore, determines the rise or fall of the one aircraft relative to the other. It was necessary for Mr. Sperry to train himself to use the elevator and throttle in these reverse functions before it was possible for him to make contact.

Another point that was found in these preliminary flights, was that it is impossible to touch the trapeze by approaching on the same level. This is because to the pilot on the rear plane the whole machine ahead goes out of sight, as it is being approached due to the fact that the center section just ahead of the pilot's head intercepts the plane being approached, thus blotting it out to his sight. It has, therefore, been necessary to get in back of the trapeze ship, and dive below, and keep on diving until it was sighted over the rear edge of the center section. Then approach by rising so that the trapeze is always kept in view over the edge of the center section. In this way, a contact can be made at a rising angle.

Another interesting thing is that the relation of the propeller tip to the center section and pilot's eye makes the center section of the plane a visual guard for the propeller tip, since the propeller tip lies in the dead vision angle caused by it, and therefore, if the trapeze is always in view, the propeller tip cannot touch it.

Success of the Experiments

After a little experience, an attempt was made to actually touch the vertical mast with the trapeze. The first attempt failed, due to parolax. This was because as Mr. Sperry approached the trapeze, his line of vision intercepted the trapeze at a point several inches above the actual height of the vertical mast. Thus, due to the parolax, he missed the trapeze by several inches. Figuring this out on the ground, the next seven out of eight attempts were successful, and the touches varied from 6 in. to 8 in. in vertical accuracy, and 1 ft. laterally. By making a great many contacts, Mr. Sperry found that this was very easy.

Another point found was that it was necessary to fly at practically the same speed as the other ship, as any excess speed on the part of the smaller plane makes the approach uncontrollable. With more than 1 m.p.h. excess airspeed, the maneuver was found to be very difficult for when Mr. Sperry pushed forward on the elevator at the right moment to make contact, the faster and lower plane would be thrown up against the trapeze. On the other hand, when the two planes were flying at exactly the same airspeed, pressure forward on the stick would not produce this effect, nor did puffs seem to have the tendency to throw the lower machine into the upper one. This phenomena can be explained on the ground that when the lower plane is flying faster than the one above, a sudden puff of air gives reactions in the ratio of the square of the speeds, and since the lower plane is flying faster than the top one, the reaction and consequently, the rising effect is greater. This in another proof to the conclusion that it is necessary to fly at the same airspeed.

Laterally, practically all the contacts were very accurate and dead center in anything like calm air. When in rough air, the DH4 would swing laterally, and the whole trapeze would consequently shift a large distance laterally. But, after practice, it was even possible to make contacts with the trapeze moving laterally in this way by using a combination of aileron and rudder quickly.

The conclusion of these tests is that it will be a practical thing to exchange messages, fuel, and many other things between one aircraft and another, and that it will be a simple matter by means of such apparatus as herein described to train pilots to do this work, so that it will be possible for him to fly for a considerable distance in very close proximity to another aircraft. Rough air, provided the planes are flying at identically the same speed will have little influence on this maneuver.

New Gun Mount for Aircraft

As a result of an invention now undergoing final trials in the French naval arsenal, the offensive powers of fighting aircraft will be tremendously increased, it is believed by experts.

The invention was at first reported to be a newly developed recoil absorber for big guns, but it is authoritatively learned that it consists of a combined muzzle brake and muffler, similar in principle to an American invention which it is understood, is already being manufactured under the supervision of the United States Navy.

The French device, the details of which are being kept secret, was developed from a muzzle brake invented by MM. Gulliot and Bory, French naval research experts. In it there has been incorporated the muffler feature, so that the result is said to be an almost total absorption of the gun's recoil and elimination of the flash at the muzzle.

Another great advantage is seen in the fact that it makes possible a great reduction in the weight of the gun mounting, so that the airplanes of the future may carry much more powerful guns. The absence of recoil and the reduction in weight, it is believed, will likewise give increased effectiveness in naval armaments.

Henri Julliot Dead

Henri Julliot, French engineer and originator of the semi-rigid type of airship, died of heart disease March 16 in New York. He was 67 years old.

M. Julliot was born at Fontainebleau, France. After graduating from the Central School of Engineers at Paris, he became technical director of the sugar refineries of Lebaudy brothers and it was to this assistant on that was due the first successful modern airship, the Lebaudy type *Jaune*, which made her trials in November, 1902.

While the airship is to a lesser degree than the airplane the invention of one man, M. Julliot ranked in the forefront of those who may with justification be called the inventors of the airship. In the fall of 1902, when he completed, with

The late Henri Julliot

the assistance of the balloon manufacturer Surcouf, the construction of the *Jaune* or *Lebaudy I*, there existed no airship that could truthfully be called practical or serviceable. Back in 1884 Captain Renard and Lieutenant Krebs of the French army had built the first airship (*La France*) endowed with a permanency of form and a motive power adequate to enable her to overcome moderate head winds. When this ship completed a round trip between the government airship factory at Chalais-Meudon and Paris, she was hailed as the solution of the problem of "dirigibility", but her power plant, a 9 hp. electric motor was too weak and too heavy for practical purposes. Almost twenty years elapsed before airships could be made serviceable, owing to the invention of the internal combustion engine. The numerous small nonrigid airships which Alberto Santos-Dumont, the Brazilian aeronaut, built and flew between 1898 and 1904, were the first to use gasoline as the motive power, but technically his ships were very crude and decidedly inferior to *La France*. Therefore, when M. Julliot laid down the designs for the first Lebaudy airship, there had been but one airship based on scientific investigations which afforded a reliable base for further experiments. M. Julliot's great merit was that he incorporated in the *Jaune* not only the best features of *La France* but that he also improved upon them by inventing the semi-rigid type of suspension.

The Lebaudy semirigid type which he developed was characterized by a nonrigid envelope which carried on its under side an oval platform of steel tubing, from which the car was suspended by steel cables. Horizontal and vertical control planes were mounted on a steel girder which extended from the platform aft. The *Jaune* had a cigar shaped hull, of 80,000 cu. ft. capacity, 183 ft. in length and 32 ft. in diameter, and had a ballonet which was kept under pressure by means of a fan blower driven from the 40 hp. Mercedes engine which constituted the power plant. Propulsion was by means of twin propellers carried on outriggers from the car. During her first year's service this airship returned to her starting point twenty-eight times out of twenty nine, making an average speed of 22 m.p.h. The best speed attained was 26 m.p.h., and the longest voyage, made on June 24, 1904, from Moisson, 62 miles in 2¾ hr.

Truly, the problem of dirigibility could then be considered as solved, and thereafter progress in airships was rapid, the Lebaudy type retaining, with the improved types *Patrie* and *Republique*, its lead until the Zeppelin type began to emerge from its experimental state.

Following the entrance of the United States in the war of 1914-18, Mr. Julliot became technical advisor and chief engineer of the aeronautical department of the B. F. Goodrich Co. of Akron, Ohio, and in this capacity he produced several of the early "Blimps" or B class nonrigid airships for the United States Navy. After the war, when this firm temporarily discontinued the manufacture of airships, M. Julliot settled in New York where he engaged in the aeronautical consulting business.

Aircraft Exposition in Java

An aircraft exposition will be held in conjunction with the Netherlands Indies Fair which is scheduled for July 28-Aug. 12 next at Bandoeng, Java, Netherlands Indies. As this is the first time that modern aircraft will be exhibited in the Far East, and as, furthermore, about one hundred thousand persons visited the Netherlands Indies Fair last year, the importance of the event will be apparent.

Commercial and military missions of the Far Eastern powers (Japan, China and Siam) visit these fairs as a matter of course and their reports naturally influence the policy of these countries with respect to purchases of foreign equipment. In view of the strong foothold which British and French aircraft have acquired in these countries, it would be highly desirable that American aircraft manufacturers make a serious effort to be adequately represented at the Netherland Indies Fair.

Considerable reductions on return freight rates, some of them as high as 50 per cent, have been granted on this occasion by several steamship companies plying between America and the Netherlands Indies. Unsold goods will be returned by the local railroads free of charge to the local port of entry within six weeks after closing date of the Fair. Space rents at the Fair vary from 20.00 to 40.00 Dutch Florins (approx. $8.00 to $16.00) per square metre of ground area. Firms reserving space before April 30 are entitled to a reduction in rate of 15 per cent, before May 31 to 10 per cent, and before June 30 to 5 per cent.

All inquiries should be addressed to the Netherlands Fair Association, Bandoeng (Java), Netherlands Indies. The telegraphic address is "Jaarbeurs, Bandoeng". Use A B C Code, 5th Edition.

Indianapolis Gets Balloon Race

The city of Indianapolis has been selected by the National Aeronautic Association of U. S. A. as the site of this year's National Balloon Race. The contest will be held between June 9 and July 4, and the Indianapolis motor speedway will be used as the starting field. Entry of fourteen balloons is assured.

ARMY AND NAVY AIR NEWS

Air Service

Army Orders—Assigned to Philippine Dept., to sail from San Francisco on or about May 23, 1923: First Lieuts Roy W Camblin, Selfridge Field, Jack Greer, Middletown A I D., Penn.; Milo McClure, McCook Field.

First Lieut. Cortlandt S Johnson, A S, redirected to Panama Canal Zone (in lieu of Mitchel Field.)

Assigned to Hawaiian Dept. to sail on or about April 17, 1923, from San Francisco: First Lieuts. Floyd A Lundell, Chanute Field, and William G. Moore, Mitchel Field.

Tech. Sergt. John McDonald, 12th Airship Co. will be placed upon retired list at Scott Field.

Warr. Off. William J. Callaghan from Middletown A I D. to Bolling Field.

First Lieut. Edwin Sullivan, A S, from Asst. Gen. Supply Depot, Houston, Tex., to Panama Canal Zone via Galveston, Tex., and New York City.

Maj. Roy M. Jones, A S, to command Middletown A I D. in addition to present duties.

Capt. Walter Bender, A S, from training at Brooks Field to El Paso, Tex., with A S. Troops.

First Lieut. Robert D. Knapp, A S, from 13th Obs. Sqd., El Paso, Tex., to Maxwell Field, Montgomery, Ala.

First Lieut. Jack J. O'Connell, A S, from Kelly Field to El Paso, Tex., with A S. Troops.

Capt. Robert D. Oldys, A S, redirected to report to Chief of Air Service (in lieu of Adjutant General).

Capt. Vernon L. Burge, First Lieut. Norman D. Brophy and First Lieut. Robert E. Selff, Air Service, redirected to leave San Francisco for the Philippines on or about May 29, 1923, (in lieu of Feb. 9).

The appointment and assignment of the following named Second Lieutenants, A S, Regular Army from Enlisted Men R A, and from civil life is announced:

Leo Henry Dawson, to Technical School, Chanute Field.

Michael Vincent Healey, to Air Service Primary Flying School, Brooks Field.

Hilton Welborn Long, to Air Service Primary Flying School, Brooks Field.

Milton John Smith, to Kelly Field.

James Edmunge Gardner, to Air Service Primary Flying School, Brooks Field.

Richard Andre Peterson, to Air Service Primary Flying School, Brooks Field.

Walter Howard De Lange, to Kelly Field.

Walter Sidney Smith, to Kelly Field.

Ralph Adel Snively, to Air Service Primary Flying School, Brooks Field.

* * *

Award of Medals of Honor—The War Department has posthumously awarded a Medal of Honor to the following named Air Service officers:

Harold Ernest Goettler, first lieutenant, pilot, 50th Aero Squadron, Air Service. For conspicuous gallantry and intrepidity above and beyond the call of duty in action with the enemy near Bunarville, France, Oct. 6, 1918. Lieutenant Goettler, with his observer, Sec. Lieut. Erwin R. Bleckley, 130th Field Artillery, left the airdrome late in the afternoon on their second trip to drop supplies to a battalion of the 77th Division which had been cut off by the enemy in the Argonne Forest. Having been subjected on the first trip to violent fire from the enemy, they attempted on the second trip to come still lower in order to get the packages even more precisely on the designated spot. In the course of this mission the plane was brought down by enemy rifle and machine-gun fire from the ground, resulting in the instant death of Lieutenant Goettler. In attempting and performing this mission Lieutenant Goettler showed the highest possible contempt of personal danger, devotion to duty, courage and valor. Next of kin: Mrs. Gertrude Goettler, mother, 50 Williams Street, Brookline, Mass. Residence at appointment: 4630 Dover Street, Chicago, Ill.

The citation on page 5, General Orders, No. 130, War Department, 1918, relating to the posthumous award of the distinguished-service cross to Second Lieut. Harold Ernest Goettler, is rescinded.

Erwin R. Bleckley, second lieutenant, 130th Field Artillery, observer, 50th Aero Squadron, Air Service. For conspicuous gallantry and intrepidity above and beyond the call of duty in action with the enemy near Bunarville, France, Oct. 6, 1918. Lieutenant Bleckley, with his pilot, First Lieut. Harold E. Goettler, Air Service, left the airdrome late in the afternoon on their second trip to drop supplies to a battalion of the 77th Division, which had been cut off by the enemy in the Argonne Forest. Having been subjected on the first trip to violent fire from the enemy, they attempted on the second trip to come still lower in order to get the packages even more precisely on the designated spot. In the course of his mission the plane was brought down by enemy rifle and machine-gun fire from the ground, resulting in fatal wounds to Lieutenant Bleckley, who died before he could be taken to a hospital. In attempting and performing this mission Lieutenant Bleckley showed the highest possible contempt of personal danger, devotion to duty, courage and valor. Next of kin: E. E. Bleckley, father, Fourth National Bank, Wichita, Kans., Residence at appointment: 111 Lorraine Avenue, Wichita, Kans.

The citation on page 4, General Orders No. 130, War Department, 1918, relating to the posthumous award of the distinguished-service cross to Second Lieut. Edwin R. Bleckley, is rescinded.

* * *

Croix de Guerre not a Collective Award—The question whether members of a Military Unit decorated with the Croix de Guerre have the right individually to wear this decoration has been answered in the negative by the French war ministry. The following letter which appeared in *Army and Navy Journal* removes all doubts on this subject:

(Translation.)

Ministère de la Guerre, Cabinet du Ministre, 2e Bureau, No. 1952M.

République Française, Paris, Jan. 25, 1923.

Sir: You call my attention on the rights to the "Croix de Guerre" of members of the 11th Aerial Squadron, A E F., in France.

I beg to inform you that, despite our close investigation, we were unable to trace the award of the "Croix de Guerre" to the above mentioned squadron.

I will add that a collective citation does not allow the members of a unit having been awarded the Croix de Guerre to wear the latter, excepting however those whose names were mentioned in the text of the citation.

In these conditions I cannot take a favorable action on your request, and I beg you to accept my apologies.

Believe me, etc.

For the Minister and by his order:

THE SOUS-DIRECTEUR.

(Signed) Illegible.

Mr. George H. Swasey, 109 Faubourg St., Honoré, Paris.

New Airship Makes Successful Trials—The new Army Airship D2, recently erected at Scott Field by the members of the Airship Class of the Air Service Balloon and Airship School made its first test flight on Feb. 6. The test was successful in every way. Communications were established between the ship and Scott Field by radio telephone, and conditions of the flight were reported to Col. C. G. Hall, Commanding Officer.

The pilots of the D2 on this flight were Lieut. H. H. Holland, in command, Lt. Arthur Thomas, direction, and Lt. Don. L. Hutchins, altitude.

The second test flight of the D2 was made on Feb. 8, when, taking off the field at 9:55 a. m., the ship flew over Belleville, crossed the Mississippi, and circled back and forth over St. Louis, Mo. While over the city the ship's commander conversed with the operators of the broadcasting stations of the St. Louis newspapers over the radio.

The airship returned to the field after a very satisfactory flight, and was put away in the hangar at 1:20 p. m. On this flight were Lieut. H. H. Holland, in command, Lieut. Arthur Thomas, direction pilot, and Lieut. Ira F. Koenig, altitude pilot.

The D2 has a capacity of 100,000 cu. ft., is 198 ft. long, 51 ft. high, and 38 ft. wide. It has a full cruising speed of 58 m.p.h. and uses two Wright "V" type motors, developing 180 hp. each. This ship has a useful lift of 4,140 lb. and can take up twelve persons under normal conditions.

It is expected that the D2 will shortly be turned over to the Air Service Balloon and Airship School for use in instructing students in airship piloting.

* * *

Giving the Good Example—According to a report just received by the Chief of Air Service from the Commanding Officer of the Middletown Air Intermediate Depot, Penn., 12,000 lb. of freight have been moved by air from that depot to various other Air Service fields. These shipments consisted of spare parts for airplanes and engines, aviators' clothing, and miscellaneous stores. Of this volume of freight, 1500 lb. were transported in DH4B airplanes, 4300 lb. in Martin Bombers and 6200 lb. in Handley-Page machines.

Very often, whenever it is found necessary to transfer officers and enlisted men from one station to another, some of them as far apart as 800 miles, the airplane furnishes an economical and rapid means of transportation. By using a big bombing plane it is possible to transport five or six men at one time. A considerable number of enlisted men of the Air Service who are detailed to take the course of training for mechanics at Chanute Field, Rantoul, Ill., make the journey via the air route.

Some months ago, when the Air Service troops at Ellington Field, Houston, Tex., were transferred to Selfridge Field, Mt. Clemens, Mich., a distance of 1100 miles, practically all of the personnel traveled to their new station by airplane. The entire cost of the journey by air was estimated at a sum $6,448 less than it would have cost the government had the movement been made by rail.

* * *

Attack Planes for the 30th Squadron—The 30th Attack Squadron, stationed at Kelly Field, has turned all its DH4B airplanes to the 26th Attack Squadron and received in their place three GAX biplanes. During the inspection of Kelly Field by Gen. William Mitchell, two of these planes, with Captain Harvey and Lieutenant Griffin as pilots, and enlisted men as gunners, participated in a machine gun test flight, carried out under the direction of General Mitchell. The planes made three trips around the field, firing machine guns with the ground crew's time.

* * *

Pursuit Airplanes Equipped for Long Flights—An MB3A airplane at Selfridge Field has been equipped with a releasable gas tank containing 37 gal. of gasoline. This tank is suspended from the bomb rack under the fuselage. The releasing device is controlled from the cockpit. This added supply of gasoline will increase the flying radius of an MB3A to about 400 miles. The tank was designed by McCook Field.

Ground Attack Airplane for 8th Attack Squadron—The 8th Attack Squadron at Kelly Field received its first twin-engined ground-attack airplane, which is armored and officially designated as the GA1 type. Considerable interest is being shown in this type of airplane, due to its possibilities in attacking ground troops at a low altitude with machine guns and bombs. A new gunnery range adjacent to Kelly Field is being rapidly put into shape in order to carry on practice missions.

* * *

Air Activities in the Philippines—Activities are once more under way at Camp Cloudio, where the large F5L seaplanes are being placed in condition for active service. These seaplanes have been held in reserve for the year, and before they can be launched the track leading from the hangars into Manila Bay must be raised from beneath the sandbar which has formed over it a short distance from the shore.

Naval Aviation

Naval Orders—Lieut. James R. Kyle, det. Nav. Air Sta., Pensacola, Fla., to U S S. Langley.

Lieut. Edward D. Gualtin (C E C), det. Navy Yard, Philadelphia, Pa.; to Naval Aircraft Factory.

Lieut. Comdr. Robert T. Young, det. Nav. Air Sta. Pensacola, Fla.; to Rec. Barracks, Hampton Roads, Va.

* * *

Naval Seaplanes as Life Saver—The value of the seaplane as a saver of life was again proved on March 18. On that date the Torpedo and Bombing Plane Squadron of the Pacific Fleet was anchored in San Diego harbor. Word was received that two men were foundering in a thirty mile gale twenty miles out to sea. In fifteen minutes the F5L seaplane in command of Ens. M. A. Schur weighed anchor and took off to pick up the men. The boat was sighted and the seaplane landed along side, though not without difficulty, for the seas were running high and landing required great skill. The two men were rescued from the small boat and brought back to San Diego in an exhausted condition.

Marine Corps Aviation

Organization—The aeronautic organization of the U. S. Marine Corps is administered by the Aviation Section, Operations and Training, Marine Corps, and by special details for supervising design, production, inspection, tests and delivery of aircraft *materiel*, which are stationed at various aircraft manufacturing concerns, the Naval Aircraft Factory, Army Air Organizations and the Bureau of Naval Aeronautics.

For support of operations of Marine Corps at Naval Forces in the United States there exists the following combat organization:

(a) First Aviation Group, Marine Barracks, Quantico, Va. This Group, stationed at the East Coast Expeditionary Force Air Base, consists of one Group Headquarters, one Observation Plane Squadron (V O Squadron 3), one Fighting Plane Squadron (V F Squadron 1) and one Kite Balloon Squadron (Z K Squadron 1) with respective squadron headquarters.

(b) Observation Squadron 1, Santo Domingo City, D. R.

(c) Observation Squadron 2, Port-au-Prince, Haiti.

(d) Scouting Squadron 1, Sumay, Guam, Marianne Islands.

(e) Inactive Marine Coastal Station, Parris Island, S. C.

The tactical organization of the Marine Corps Aircraft Squadrons is the same as that of the Naval Aircraft Squadrons, namely, eighteen aircraft for the Plane Squadrons and eight balloons for the Kite Balloon Squadrons. None of the Marine Corps Squadrons is, however, fully organized as yet, most of them consisting only of one or two divisions (six to twelve planes), and of four aircraft for the Kite Balloon Squadrons.

At present there is no Marine Corps Aeronautic Organization afloat.

Howard E. Coffin, Pres. B. H. Mulvihill, V. Pres. B. F. Castle, Treas. John B. Coleman, Rec. Sec.

Official Bulletin of National Aeronautic Association of U.S.A.

Col. H. E. Hartney, General Manager Cable Address Nataero
National Headquarters, 26 Jackson Place, Washington, D.C.

The National Aeronautic Association of U.S.A. assumes responsibility for the statements under this heading

For the guidance of all those concerned in the organization of local chapters of the National Aeronautic Association, and for the information of the members of the Association and the public at large, the following memorandum on chapters of the N.A.A. is made public.

MEMORANDUM ON CHAPTERS

(A) Advantages of Chapter

The advantages of the Chapter are

(1) It provides a means of social intercourse between the members, an opportunity for members to broaden their acquaintanceship and their usefulness to their communities through committee work.

(2) It provides a community with a strong unit of a national body which, by its construction, is able to reach every phase of activity in that community on aeronautic matters.

(3) It provides an agency which, in the future, will be able to handle most of the detail of membership renewals and records.

(4) By the fact that the Chapter is a newly-created organization, which is able to cooperate with every pre-existing organization in the community, all danger of arousing dissention and jealousy on the grounds of favoritism, is done away with. The Chapter can only be organized after the membership of the particular community reaches one hundred. This provides a nucleus which can be greatly expanded once a Chapter is formed.

(5) Through the committees of a Chapter, the Association is able to hold out to prospective members interesting, patriotic, broadening and instructive work.

(6) When a member of the Association has a local Chapter available, the Association is able to keep him interested in the work of aeronautics and the Association, and the possibilities for renewals is greatly increased.

(B) Committees

National Headquarters has provided that each Chapter will have the committees listed below, and will issue a pamphlet entitled "Instruction for Forming Chapter Committees" and will also furnish bulletins, letters, and general information from time to time entailing suggestions to Chapter Committees, and requiring reports which will keep the committees active.

These committees are —

(1) Finance and investment
(2) Airways and landing fields.
(3) Junior activities and education
(4) Publicity
(5) Membership
(6) Entertainment.
(7) Legislation

(C) Instructions to Committees

The instructions on forming committees and suggestions, bulletins and assistance emanating from National Headquarters will be based on the following for each committee

(1) *Finance and Investment*

a. *Formation of Committee*
This committee should be comprised of leading bankers and investment brokers.

b. *Suggestions*
The committee will pass on all questions of finance affecting the Chapter and its work, should cooperate with the Airways and Landing Fields Committee, by providing plans for the financing of any project sponsored or proposed. It should investigate carefully any aeronautic investment proffered the public in the community, prepare budgets for meets, events or entertainments promoted by the Chapter; arrange for the financing of the Chapter.

c. *National Headquarters.*
National Headquarters will furnish members with articles, pamphlets, suggestions and data on any phase of finance bearing on aeronautics, will keep the committee informed on aeronautic progress and development from an investment point of view. Confidential reports on all responsible and irresponsible companies will be furnished. Cooperative contact will be established by National Headquarters with bankers' associations, the Aeronautical Chamber of Commerce, and the Investment Committee of the U. S. Chamber of Commerce.

(2) *Airways and Landing Fields*

a. *Formation of Committee.*
This committee should comprise real estate dealers, bankers, contractors, civil, electrical, and mechanical engineers, architects and pilots.

b. *Suggestions.*
This committee should take steps to obtain a civic landing field. Plans should conform to regulations laid down by the Airways Section, Air Service, U.S.A., and those provided by the Safety Code Committee, Bureau of Standards. Contact should be established with the nearest cities, in order to promote a series of landing fields, which could be utilized as an airway.

c. *National Headquarters*
National Headquarters will furnish this committee with War Department documents, maps, copies of proposed Safety Code, and special bulletins. It will establish cooperative contact with organizations working on allied subjects. Price lists of supply houses, estimates and blueprints of equipment, and all other material to be used, will be provided.

(3) *Junior Activities and Education*

a. *Formation of Committee*
This committee should have as members the president of the School board; members of the leading private institutions, the president and some professors of the local college or university, if any, a few select teachers, and the pastors of those churches most active in child welfare.

b. *Suggestions*
This committee should arrange for a course of talks on aeronautics in the different schools; cooperation with the local boy scout masters, prize essays, newspaper essay contests, and carry on any other work which will not only stimulate the interest of the youth in aeronautics, but instill a proper patriotism and appreciation of the importance of preparedness.

c. *National Headquarters,*
Pamphlets, bulletins, and detailed suggestions will be furnished the committee by National Headquarters. National Headquarters will arrange cooperative affiliations with the boy scouts, educational societies, and Government and State organizations.

(4) *Publicity Committee*

a. *Formation of Committee*
This committee should have as members the editors of

the leading local papers, magazines and journals; local literary celebrities, writers and theater owners.

b. *Suggestions*
This committee will arrange for the proper treatment of aeronautics by newspapers; assist Junior Activities and Education Committee in arranging essay contests, obtain items of news value, and cooperate through the committee department of National Headquarters, with the Director of Information.

c. *National Headquarters*
National Headquarters will prepare local publicity features for release, information bulletins; pamphlets of instruction and suggestions for this Committee.

(5) *Membership*

a. *Formation of Committee.*
This committee should be comprised of the members of the Chapter who are active in social, civic and society organization work.

b. *Suggestions*
This committee should arrange through the Advisory Committee special membership drives to be carried on in all organizations in the community, should work in close harmony with the Junior Activity and Entertainment Committees, and endeavor to keep a large average of memberships coming in. It should see that each representative of any organization serving on the Advisory Committee becomes a member. It should prepare and keep records of prospects, and plans for future campaigns.

c. *National Headquarters*
Bulletins and suggestions, as well as active cooperative assistance on the part of paid executives of both National and District Headquarters, will be forthcoming.

(6) *Entertainment Committee*

a. *Formation of Committee*
This committee should comprise members prominent socially, persons active in theatrical work, fliers, and others prominent in the community.

b. *Suggestions*
It will arrange for luncheons, balls, dinners, lectures, meets and other special events, and endeavor to provide social entertainment for the Chapter.

c. *National Headquarters*
Speakers, cooperation of the National Contest Committee, bulletins, pamphlets and suggestions, will be furnished by National Headquarters.

(7) *Legislation*

a. *Formation of Committee*
This committee should comprise the leading lawyers, and those in the forefront of political activity of the State, residing in the particular community.

b. *Suggestions*
This committee should keep in touch with all Federal legislation and all legal phases of aeronautics.

c. *National Headquarters*
Information bulletins and pamphlets, and other suggestions, will be furnished from time to time by National Headquarters.

(D) Advisory Committee

Under Article VII, Sections 1 and 2 of the Chapter Constitution and By-laws, all local organizations may have from one to five representatives to attend all open meetings of the Chapter, and serve with the Board of Directors on an Advisory Committee.

a. *Formation of Committee*
This committee should be composed of as many of the five representatives as possible of such organizations as the local Kiwanis Club, Lions Club, Rotary Club, Chamber of Commerce, local Aero Club, Air Board, Merchants' Association, Manufacturers' Association, Board of Trade, Women's organizations, etc.

b. *Suggestions*
This committee should devise plans for joint lectures, circularizing the respective membership of each organization for membership in the National Aeronautic Association, promulgation of aeronautic information, obtaining the interest of, and active work for all aeronautic civic development of each organization.

c. *National Headquarters*
National Headquarters will furnish pamphlets, suggestions and data to this committee from time to time, as well as lend assistance, such as speakers, organizers, etc.

(E) Women's Advisory Committee

When sufficient women become members of the National Aeronautic Association from any Chapter community, they should immediately be formed into a women's Auxiliary Committee.

a. *Formation of Committee*
This committee should comprise those women members of the Chapter who are active in social, civic, educational and political work.

b. *Suggestions*
This committee should establish active cooperation with all local women's organizations, such as the Red Cross Chapter, League of American Pen Women, Women's Clubs, Daughters of the Confederacy, Daughters of the American Revolution, League of American Women Voters, etc. The committee should carry on any activity which it deems necessary, not only for the advancement of aeronautics, but to further any civic cause of general benefit to the community.

c. *National Headquarters*
National Headquarters will furnish the committee suggestions, contacts, data and information which it is deemed will assist.

Definition

Any ten members of the National Aeronautic Association of U.S.A. residing in the same community may make application for authority to form a Chapter. Upon receipt of such application, approved by the Governors of the District in which the community is situated, the applicant members will be granted a Charter by the National Body authorizing the creation of a Chapter under terms and conditions which will be uniform throughout the nine Districts of the Association. Provided, however, that no application for the Charter of a Chapter will be approved unless at least one hundred members, in good standing, reside in such community.

A Chapter is designed to bring into an organized unit in

Coming Aeronautical Events

AMERICAN

May 30 — Fifth Annual Aircraft Exhibition, Flying Club of Baltimore, Logan Field, Dundalk, Md.
June or July — National Balloon Race.
Oct. 1-3 — National Airplane Races, St. Louis, Mo.
Late Fall — Curtiss Marine Flying Trophy Race

FOREIGN

May 13 — Grand Prix (Balloons), Paris, France
June 25-30 — International Aero Congress, London.
July 20 — Aug. 12 — International Aero Exhibition, Gothenburg, Sweden
Aug. 3-31 — Sailplane Meet, Rhoen, Germany.
Aug. 5-26 — Sailplane Meet, Vauville, near Cherbourg, France.
Sept. 28 — Schneider Maritime Aviation Trophy Race, Cowes, Isle of Wight, England
Dec. 1 — Entries close for French Engine competition.

a community the members of the Association in order to promote social intercourse, to concentrate the efforts of the members in the furtherance of Aeronautics in the community, to add strength to the National Body by providing an organized sub-division in each locality, and to carry out such local aeronautic events as are approved and which will have the co-operation of the National Aeronautic Association.

GUIDE BOOK OF AIR LINES IN THE UNITED STATES

In co-operation with the National Aeronautic Association, the United States Touring Information Bureau, for the first time in the history of this country, includes in its directory a map of air lines in the United States, together with the location of more than 3000 airports and landing fields, improved and unimproved, which stretch from the Canadian border to the Mexican boundary. Together with the map is included a compilation of the various facilities offered at landing fields for the use of itinerant flying, for regular air lines, and for Government use, either for the Air Mail or in connection with the Army and Navy services.

This data was secured in co-operation with the National Aeronautic Association of United States, in conjunction with the Army Air Service, the Airways Section of that service contributing the records of its well organized airways section.

The Bureau and the Association realizing that two of the factors which are retarding the development of commercial aviation on a grand scale in this country are the lack of adequate landing fields and the lack of suitable gasoline supply stations, have united in an effort to spread the information regarding the facilities which are available, with the hope that our citizens will respond to the need of establishing more landing fields and gasoline stations which will not only contribute to their own economic advantage, but will fulfill in a large measure the purposes of both the Bureau and the Association.

Aviation, now having become a commonplace activity throughout the country, it was felt that to supplement the touring information service and camp ground directory with information covering the landing fields of the United States and their facilities, together with route maps, would be invaluable to the touring public. Therefore there has been installed in the office of the United States Touring Information Bureau at Waterloo, Iowa, a service for aviation comparable to that rendered to automobile tourists. This is a unique feature which is not available elsewhere in this or any other country, and the Bureau believes that it is making history in this new departure in its service.

Aviation naturally depends upon the automotive industry for its advancement along technical lines. Therefore it is closely allied with the automobile industry, the two going forward hand-in-hand in the development of our transportation facilities in connection with the ever increasing demand for speed and promptitude in commercial transactions. In consequence of this allied interest the U. S. Touring Information Bureau will be from now on able to furnish to its patrons accurate information regarding landing fields now installed, airways now in operation, and those which will be developed from time to time. Frequent additions to this guide will be most lavish in the direction of completeness, and patrons of the Bureau and members of the Association will have the most up to date facilities at their disposal. This guide is furnished free to members of the N.A.A. together with the new Service Bureau Information.

At the headquarters of the United States Touring Information Bureau, at Waterloo, Iowa, information is on file covering the locations of the District Headquarters and the various chapters of the National Aeronautic Association throughout the United States. Persons desiring information in regard to these matters may write into the Bureau Headquarters and such information will be freely and gladly given.

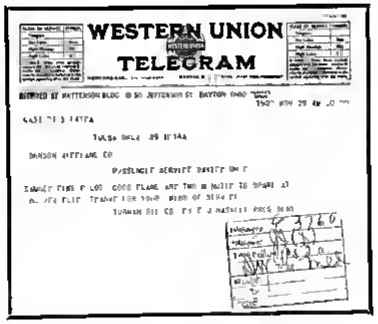
The members of the N.A.A. are invited to use this service. It is complete, and of great economic value. Tours will be laid out upon request making use of all available transportation facilities furnished by the aeronautical industry at the present time, and as such are put into operation and made available.

"If war were declared to-morrow what would we do for aircraft?"

Can You Give Service Like This?

When the "St. Louisan" left Mr. Haskell in Dayton the Telegram shows

We Caught His Train.



EQUIP YOUR PLANE WITH NEW MATERIAL AND BE PREPARED--IT PAYS.

INSTRUMENTS

Air gauges 0 10 lbs luminous dial	$2.50
Altimeter 0 2500 ft Taylor luminous dial	3 00
Backing indicator or Inclinometer bubble type	1 00
Tachometer NCR 2500 RPM luminous dial	5 00
Shafts for above 42" long for front cockpit	2.50
Warner tachometer, 8 ft. shaft	6 00
Thermometer Goyre 18 ft. lube	5 00

USED INSTRUMENT ONE HALF THESE PRICES

NAK one shatterable clear or amber	5 00
French goggletts with rubber eye pads	4.00
One piece moleskin cloth wool lined flying suits	15 00

PROPELLERS for OX5 copper tipped

Make	Wood	Type	Dia.	Pitch	Price
Buffalo	Mahogany	Curtiss	8'4"	5'3"	$15.00
Flotlorp	Birch	Toothpick	8'4"	5'	20 00
Liquid Carbonic	Birch	Toothpick	8'4"	5'	15 00
Hartzell	Oak	Special new design			65 00
American	Oak	Toothpick	8'4"	5'2"	15 00
Paragon	Ork	Paragon design			15 00

RADIATORS ROME TURNEY Hooey comb or Herrsoo cartridge type will cool over heat 15.00
Radiators Rome Turney for 150 Hispano, used 20 00
Wicker seats & cushions leather or corduroy 4 00

"The Aeronautical Supply House"

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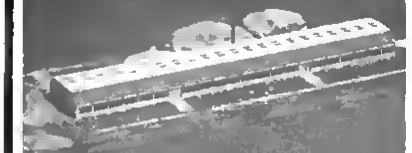

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